

Preparing the Traveler



WRAIR-GEIS Operational Infectious Disease Course



Objectives

- Discuss the epidemiology of travel-related illness
- Review key elements of the pre-travel encounter
- Identify useful online travel medicine resources



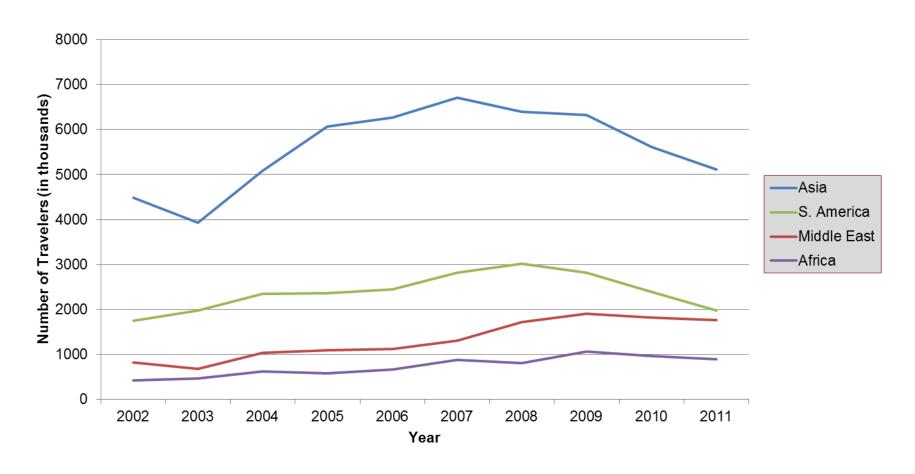


What Are the Risks?





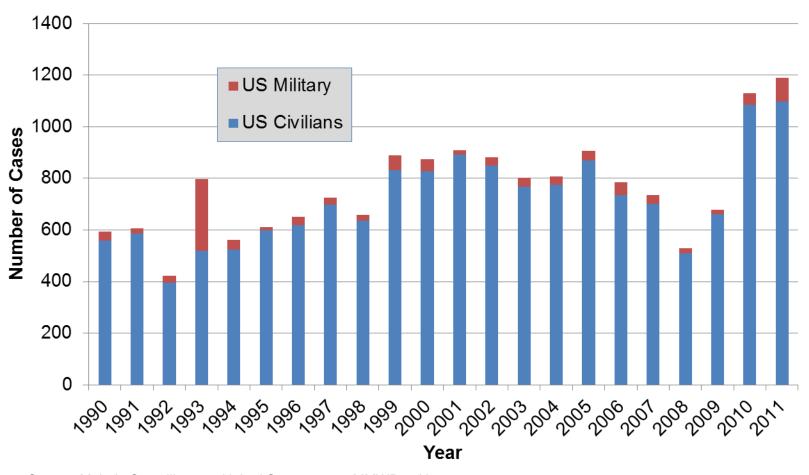
US Resident Travel Abroad: 2002-2011



Source: "2011 United States Resident Travel Abroad", US Department of Commerce, International Trade Administration, Office of Travel & Tourism



Malaria Cases in US Citizens



Source: Malaria Surveillance – United States, 2011; MMWR, 1 Nov 2013.





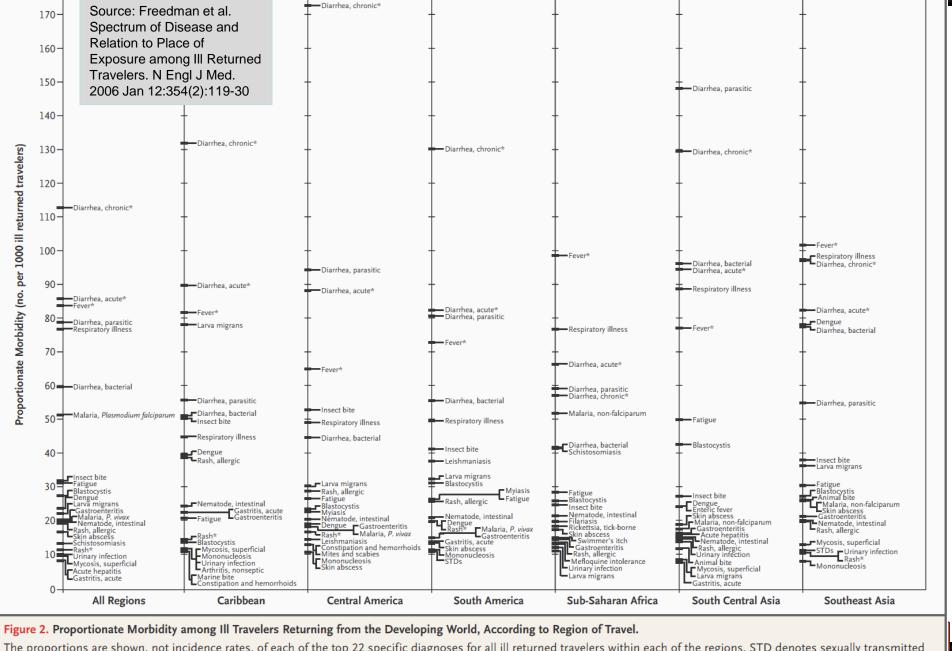
GeoSentinel Surveillance Sites



Source: Surveillance for Travel-Related Disease – GeoSentinel Surveillance System, United States, 1997-2011; MMWR, 19 Jul 2013



Slide 6



Malaria, Plasmodium falciparum

180

The proportions are shown, not incidence rates, of each of the top 22 specific diagnoses for all ill returned travelers within each of the regions. STD denotes sexually transmitted disease. Asterisks indicate syndromic diagnoses for which specific etiologic diagnoses could not be assigned.

QUESTION:

What is the most likely cause of death in US citizens traveling internationally?





Causes of Death Among International Travelers

Origin of traveler Destination of traveler Year of travel	USA (PCV) Developing country 1962–1983	USA Anywhere 1975/1984	Swiss Europe 1987	Swiss Overseas 1987	Foreign USA 1991	Australia Overseas 1995	Scotland Abroad
Cardiovascular	8.0	49.0	14.0	15.0	45.0	35.0	68.9
Infection	5.0	1.0	-	3.0	-	2.4	3.6
Other illness	8.0	?	2.0	9.0	-	-	-
Accidents	2007(03.01)						
Road accident	36.0	7.0	13.0	12.0	37.0	28.3	-
Air crash	5.0	2.0	4.0	12.0	7.0	-	-
Drowning	14.0	4.0	4.0	9.0	15.0	_	<u> </u>
Other injuries	23.0	12.0	2.0	11.0	23.0	26.0	20.7
Unknown	2	25.0	58.0	29.0	12	17.0	7.0

Source: Keystone et al. Travel Medicine. 2004





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Goals of The Pre-Travel Encounter

- Protect travelers from disease and death associated with international travel
- Minimize the impact of travel-related illness through the use of self-treatment
- Protect the public from emerging pathogens associated with international travel





Key Things to Remember

- Risk may be difficult to estimate, but risk assessment is essential nonetheless
- Goal should be to "manage" risk, not "eliminate" risk
- Vaccines and chemoprophylaxis are wonderful, but only go so far – consider other PPMs
- Illness can occur during and following travel
- What we do for the leisure traveler may be different from what we do for the deploying individual or unit





When is a Travel Health Consultation Needed?

United States & Canada

Travel Outside the "Safe" Zones

Western & Northern Europe

Japan, Australia & New Zealand





The Pre-Travel Encounter

- Review of Itinerary and Medical History
- Immunizations
- Malaria Prophylaxis
- Self-Treatment Medications
- Personal Preventive Measures





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Review of Itinerary

- Where?
 - Country, region, urban/rural, altitude
- When?
 - Length of travel, time of year
- Why?
 - Leisure, work, humanitarian
- Who?
 - Travel companions, visiting friends/relatives (VFR)
- What?
 - Basic tourism/sightseeing itinerary vs. adventure travel
- How?
 - Lodging, meals/water, transportation, medical care

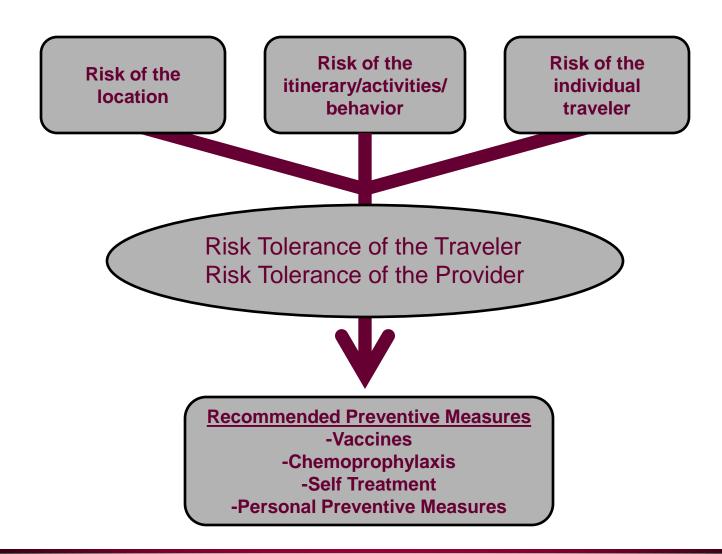


Review of Current/Past Medical History

- Current Medical Conditions
 - Heart disease, pulmonary disease, renal disease,
 MS, thymus disorder, HTN, DM, immune system disorders, malignancy
 - Pregnancy/breastfeeding
- Past Medical History
 - Psychiatric, cardiac conditions, epilepsy/seizures,
 DVT, ear/sinus problems
- Medications
- Allergies
 - Medications, vaccines, foods, latex
- Vaccination History



The Art of Travel Medicine: Pre-Travel





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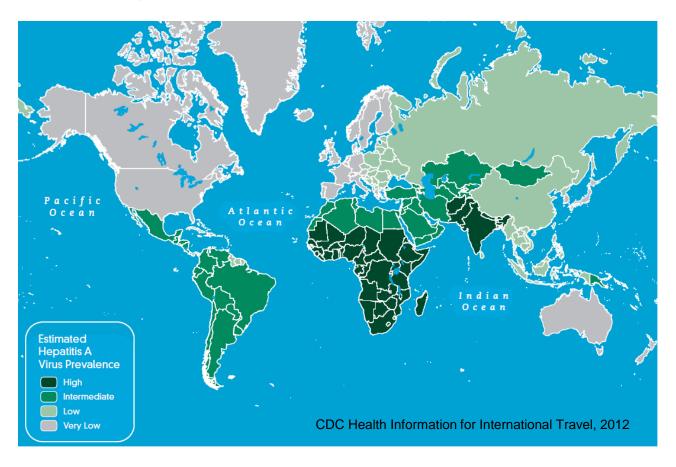
Immunizations for Travelers

- "Travel" Vaccines
 - Widespread Risk
 - Hepatitis A
 - Typhoid
 - Geographic Risk
 - Yellow Fever
 - Meningococcal
 - Polio
 - Japanese Encephalitis
 - Duration/Activity Risk
 - Hepatitis B
 - Rabies

- "Routine" Vaccines
 - Childhood
 - MMR, Varicella, DTaP, Polio, HiB, Hep A, Hep B, PCV, Rotavirus, Influenza
 - Adolescent/Adult
 - Tdap
 - Meningococcal
 - HPV
 - Influenza
 - Pneumococcal
 - Varicella/Zoster
 - MMR

Hepatitis A Immunization

Geographic Distribution of Hepatitis A







Hepatitis A Immunization

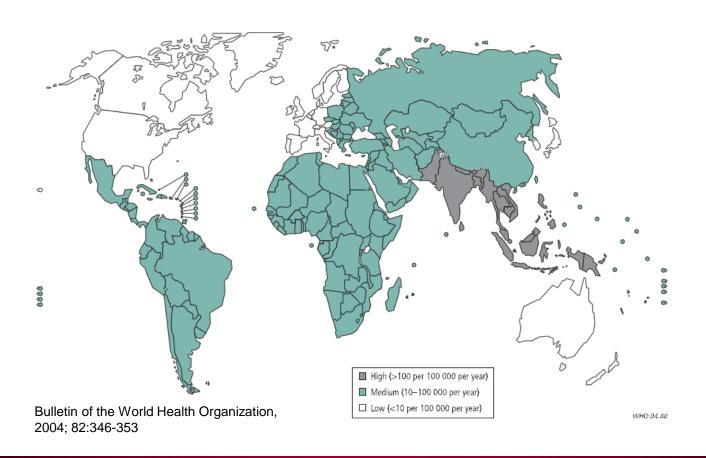
- Hepatitis A Vaccine
 - Inactivated vaccine whole virus vaccine (Vaqta®, Havrix®)
 - 2 dose series (0 & 6 months) provides life-long protection
 - Also available as combination Hep A/Hep B vaccine (Twinrix®)
- Hepatitis A Immune Globulin
 - Rarely necessary; one dose of vaccine anytime pre-travel provides protection in most healthy people
 - Consider for travelers departing within two weeks if:
 - Immune compromised
 - Chronic liver disease
 - Unable to receive hepatitis A vaccine





Typhoid Fever Vaccine

Geographic Distribution of Typhoid Fever







Typhoid Fever Vaccine

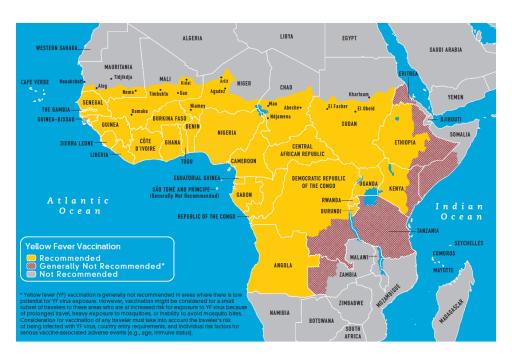
- Inactivated injectable vaccine (ViCPS, Typhim Vi®)
 - Single dose; booster every 2 years
- Live oral vaccine (Ty21a, Vivotif®)
 - 4 doses, 1 capsule every 48 hours; booster every 5 years
 - Must be refrigerated, take with cool liquids, avoid antibiotics immediately before and after
- Efficacy for both: 50-80%







Geographic Distribution of Yellow Fever



CDC Health Information for International Travel, 2012





- Vaccine Overview
 - Live virus vaccine (YF-VAX®)
 - Single dose; booster every 10 years (but likely to change)
 - Required for entry into several countries
 - Consider flight itinerary and transit through YF endemic countries
 - Provide waiver for those with vaccine contraindications
- Precautions
 - Caution in travelers > 60 years old
 - Avoid in breastfeeding mothers and patients with MS
 - Contraindicated in those with egg allergies, immunocompromised, thymus disorders (thymoma or myasthenia gravis), active malignancy

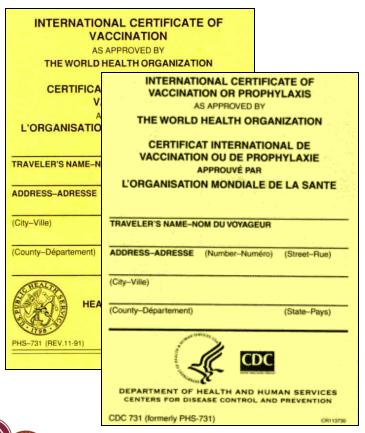


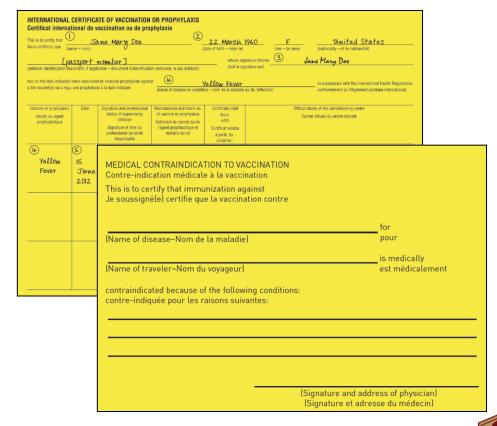
- Complications
 - Vaccine-associated neurotropic disease
 - Meningoencephalitis, bulbar palsies, Bell's palsy, GBS
 - 0.4 0.8 cases per 100,000 vaccine doses
 - Vaccine associated viscerotropic disease
 - Similar to natural YF infection
 - 0.3 0.4 cases per 100,000 vaccine doses
 - 1.6/100,000 in first time vaccine recipients > 60 y/o
 - Meningoencephalitis in breastfeeding infants
 - 10x increased risk of multiple sclerosis relapse





International Certificate of Vaccination







Meningococcal Vaccine

The "Meningitis Belt"





CDC Health Information for International Travel, 2012

Meningococcal Vaccine

- Quadrivalent (A,C,Y,W-135) vaccine; booster every 3-5 years
- Available as polysaccharide (Menomune®) and conjugate vaccines (Menactra®, Menveo®)
- Recommended for travel to the African meningitis belt
 - During high risk periods (Dec Jun) for typical travelers
 - Year-round for those engaged in healthcare operations
- Required by Saudi Arabia for those entering the country for Hajj or Umrah pilgrimage





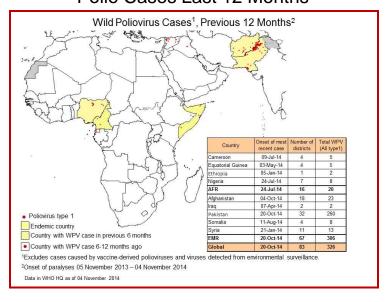
Polio Vaccine

- Inactivated virus vaccine
- Primary series and single adult booster recommended for travel to areas with recent or ongoing transmission

Polio in 1988

Endemic countries

Polio Cases Last 12 Months







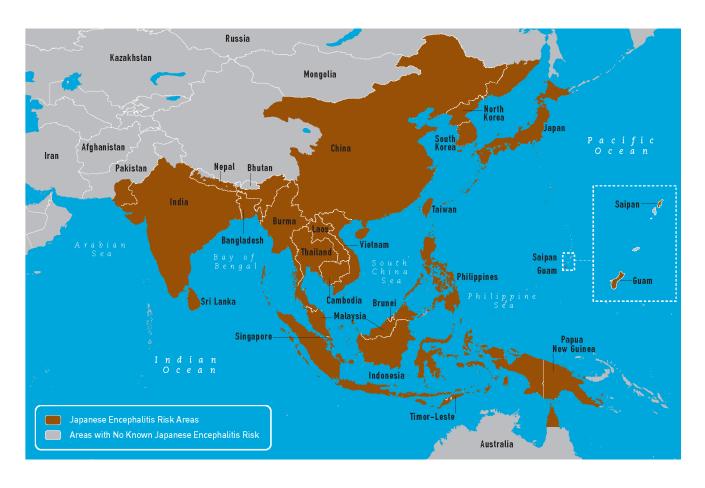
Japanese Encephalitis Vaccine

- JE-VAX no longer available; inactivated vero-cell derived vaccine (Ixiaro®) licensed in 2009
- 2-dose series: day 0 and 28; booster after 1 year
- Licensed for use in age 2 months and older
- Recommended for:
 - Prolonged exposure in high risk regions (rural farming areas)
 - Duration > 1 month
 - Frequent short stays to high risk areas
 - Significant outdoor exposure (adventure travelers)
 - Rarely necessary for short itineraries or urban environments





Geographic Distribution of Japanese Encephalitis





CDC Health Information for International Travel, 2014

Hepatitis B Vaccine

- Inactivated viral antigen vaccine
- 3-dose series: 0, 1, and 6 months
- Recommended for:
 - Prolonged exposure in high risk regions
 - Duration > 3 months
 - Frequent short stays to high risk areas
 - High risk activities
 - Possibility of new sexual partner
 - Possibility of needing medical or dental care
 - Tattooing, body piercing, acupuncture
 - Healthcare workers





Rabies Vaccine

- Inactivated virus vaccine
- 3 dose series: 0, 7, and 21-28 days
- Post-exposure vaccine still required after exposure (2 doses)
- Recommended for:
 - Prolonged exposure in high risk regions
 - High risk activities
 - Potential exposure to animals (adventure travelers)
 - Occupational exposure
 - Other considerations
 - Young children
 - Limited access to medical care, remote locations





Routine Childhood Vaccinations

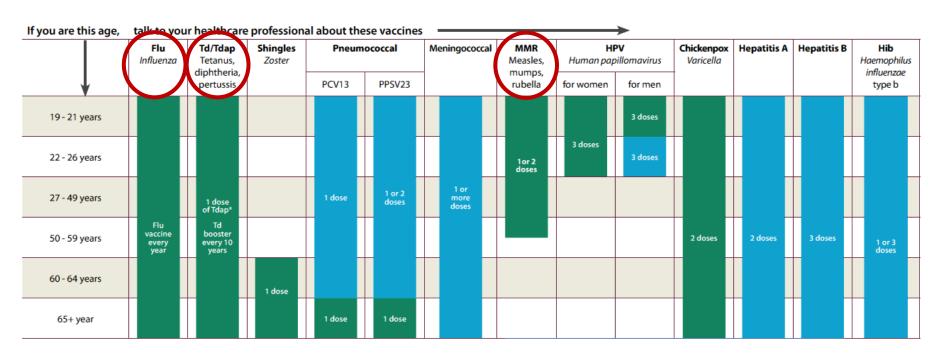
- Complete routine immunizations whenever possible
 - Don't forget influenza vaccine!
- Early/accelerated schedules may be recommended
 - Hepatitis B, DTaP, HiB, PCV, rotavirus, polio
- Measles vaccination is an important consideration for all children traveling OCONUS
 - Children aged 6-11 months should receive 1 dose of MMR vaccine, followed by 2 additional doses after first birthday
 - Children aged ≥ 12 months should receive 2 doses of MMR vaccine, separated by ≥ 28 days





Routine Adult Vaccinations

ACIP Recommendations - 2014





Recommended For You: This vaccine is recommended for you *unless* your healthcare professional tells you that you cannot safely receive it or that you do not need it.



May Be Recommended For You: This vaccine is recommended for you if you have certain risk factors due to your health, job, or lifestyle that are not listed here. Talk to your healthcare professional to see if you need this vaccine.





The Pre-Travel Encounter

- Review of Itinerary and Medical History
- Immunizations
- Malaria Prophylaxis
- Self-Treatment Medications
- Personal Preventive Measures





Malaria Prevention

- Risk assessment is important
 - Risk can vary significantly within regions and countries
 - Risk changes over time
- No Vaccine Chemoprophylaxis is the key!
 - Consider resistance trends
 - Understand precautions/contraindications
 - Encourage patients to follow dosing/duration
- Other preventive measures still important
 - Chemoprophylaxis is not 100% effective
 - Vectorborne diseases other than malaria





Malaria in US Travelers

TABLE 6. Number* and percentage of imported malaria cases among U.S. civilians, by purpose of travel at the time of acquisition — United States, 2011

Category	No.	(%)
Visiting friends and relatives	607	(55.4)
Tourist	45	(4.1)
Missionary or dependent	96	(8.8)
Business representative	78	(7.1)
Student or teacher	32	(2.9)
Air crew or sailor	10	(0.9)
Other	3	(0.3)
Unknown	224	(20.5)
* N=1,095		

Source: Malaria Surveillance – United States, 2011; MMWR, 1 Nov 2013.



Malaria Chemoprophylaxis

Medication	Dosing	Begin	End
Atovaquone-proguanil 250mg/100mg	Daily	1-2 days pre-travel	7 days post-travel
Mefloquine 250mg	Weekly	2-3 weeks pre-travel	4 weeks post-travel
Chloroquine 500mg	Weekly	1-2 weeks pre-travel	4 weeks post-travel
Doxycycline 100mg	Daily	1-2 days pre-travel	4 weeks post-travel

^{**}Primaquine can be used off-label for prophylaxis





Malaria Chemoprophylaxis

Medication	Precautions/Contraindications
Atovaquone-proguanil	Pregnancy; breastfeeding a child < 5kg; severe renal impairment
Mefloquine	Current/recent depression or anxiety; history of SI/HI, psychotic disorder or seizures
Doxycycline	Pregnancy; age < 8 y/o; women prone to yeast infections





DoD Policy on Mefloquine

HA Policy 13-002 Guidance on Medications for Prophylaxis of Malaria, 15 Apr 2013

- Chloroquine is the drug of choice for chloroquine-sensitive regions
- Atovaquone-proguanil or doxycycline are acceptable first line drugs for chloroquine-resistant regions
- Mefloquine should be reserved for individuals with intolerance or contraindications to both first line drugs
- Before prescribing mefloquine, be sure to identify any contraindications and ensure patient is provided FDA-required patient information handout





Chloroquine-Sensitive Regions

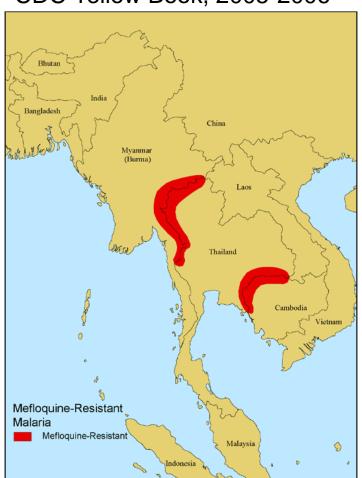
- Caribbean
 - Dominican Republic, Haiti
- Central America
 - Belize, Costa Rica, El Salvador, Guatemala, Honduras, Mexico, Nicaragua
- South America
 - Argentina, Paraguay (but malaria risk is LOW)
- Asia
 - Azerbaijan, Georgia, South Korea (but malaria risk is LOW)



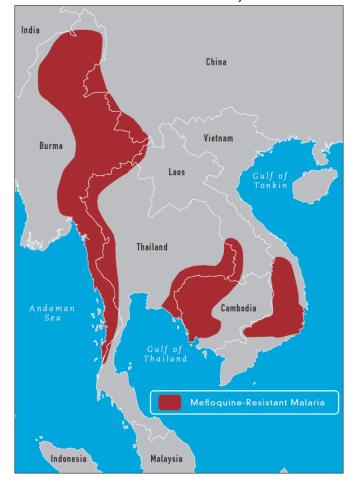


Mefloquine Resistance

CDC Yellow Book, 2005-2006



CDC Yellow Book, 2012







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Traveler's Diarrhea - Causes

- Bacteria 80-90%
 - Enterotoxigenic E. coli
 - Campylobacter
 - Shigella
 - Salmonella
 - Aeromonas
 - Plesiomonas

- Virus 5-8%
 - Norovirus
 - Rotavirus
- Protozoan <3%
 - Giardia
 - Cryptosporidium
 - Entamoeba histolytica
 - Cyclospora





Self-Treatment for Traveler's Diarrhea

- Mild illness
 - Bismuth subsalicylate
- Moderate to severe illness
 - Loperamide plus antibiotic
 - Combination treatment is safe and effective
 - Safety with invasive disease (fever, blood) a concern
 - Fluoroquinolone: 1-3 days course
 - Azithromycin: 1 g single dose or 500mg daily for 1-3 days
 - 1st line antibiotic for Southeast Asia and South Asia (India, Nepal) due to fluoroquinolone resistance





Chemoprophylaxis for Traveler's Diarrhea

- Bismuth subsalicylate
 - 2 oz. of liquid or 2 tablets taken 4 times per day
- Antibiotics
 - Generally NOT recommended
 - Self-treatment often results in rapid improvement
 - May increase risk of side effects (C. difficile colitis)
 - May contribute to antibiotic resistance
 - Possible uses
 - Immunosuppressed travelers
 - Medical conditions with risk for complications from TD (Crohn's disease, ulcerative colitis, chronic diarrhea)
 - Critical travel in which illness would have significant impact





Traveler's Diarrhea Medications

Table 6.	Recommended	agents for	r traveler's	diarrhea.
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Use, agent	Dosage	References
Prophylaxis ^a		
Bismuth subsalicylate (Pepto Bismol)	Two tablets chewed 4 times per day	[168–170]
Norfloxacin ^b	400 mg po daily	[171–173]
Ciprofloxacin ^b	500 mg po daily	[174, 175]
Rifaximin	200 mg qd or bid	[176]
Symptomatic treatment ^c		
Bismuth subsalicylate (Pepto Bismol)	1 oz po every 30 min for 8 doses	[177]
Loperamide	4 mg po then 2 mg after each loose stool not to exceed 16 mg daily	[15, 178–180]
Antibiotic treatment ^d		
Fluoroquinolones		
Norfloxacin	400 mg po bid	[181–183]
Ciprofloxacin	500 mg po bid	[184-190]
Ofloxacin	200 mg po bid	[191-193]
Levofloxacin	500 mg po qd	[16]
Azithromycin	1000 mg po once	[16, 194]
Rifaximin ^e	200 mg po tid	[17, 184, 195]

Hill DR. Clin Inf Dis (IDSA Guidelines) Dec 2006; 43:1499-1539



Altitude Sickness

- PO₂ at 10,000 feet is 70% of sea level value
- Illness results from mild to moderate hypoxia
- Symptoms can occur at altitudes above 8,000 feet
- Acute mountain sickness is the most common
 - Headache
 - Fatigue
 - Loss of appetite
 - Nausea
 - Insomnia





Altitude Sickness

- Prophylaxis: Acetazolamide 125mg BID, start 24 hrs before ascent, continue for 48 hrs at highest altitude
- Treatment: Acetazolamide 250mg BID
- Expected side effects: numbness/tingling in extremities, increased urination

Patient History	Consider Prophylaxis	Prophylaxis Recommended
Past history of AS	8,000-9,000 ft	>9,000 ft
No history of AS	9,000-11,500 ft	>11,500 ft





Jet Lag

- Temporary disorder of the body's sleep-wake cycle
- Symptoms can include:
 - Poor sleep, early wakening, fractionated sleep
 - Poor performance of physical and mental tasks
 - Fatigue, headaches, irritability, GI upset
- Strategies for prevention/treatment:
 - Adjust sleep time pre-travel
 - Use bright light to adjust sleep-wake cycle
 - Avoid long naps
 - Eat meals appropriate to local time
 - Medications: zolpidem (Ambien®), temazepam (Restoril®)





Other Self-Treatable Conditions

- Motion sickness
 - Antihistamines, scopalamine (oral or transdermal), meclizine, promethazine
- Recurring bacterial/fungal infections
 - Urinary tract infection
 - Vaginal yeast infection
- Common minor injuries/illnesses
 - Analgesic, decongestant, antibiotic ointment, mild laxative, antacid, throat lozenges





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Personal Preventive Measures

- Food/beverage precautions
- Hand hygiene
- Insect precautions
- Animal bite precautions
- Safety/security
- Freshwater avoidance
- Heat/cold Injuries
- Sexually transmitted infections





Food/Beverage Precautions

Boil it, Peel it, or Forget it!.....But is that really possible?











Lower Risk Foods:



Breads







Fully cooked vegetables, beans and rice that are kept and served hot



Boiled or well done meats (lamb, beef, poultry and fish) that are eaten within 2 hours after cooking





Hard-skin fruits and vegetables that you peel yourself (bananas, oranges and limes)



Hot tea



Bottled water or canned carbonated drinks that







Eat SMART

USAPHC-HIOProgram@amedd.army.mil

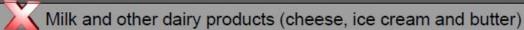
you open yourself

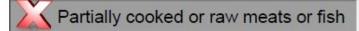
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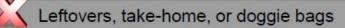
Higher Risk Foods:

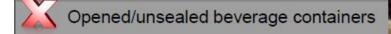












Ice, iced drinks, frozen desserts and juices

Locally canned or packaged products











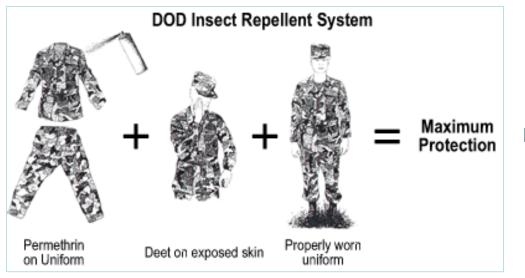




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Insect Precautions







Best Insect Repellants: DEET (30-40%) or Picaridin (20%)





Animal Bite Precautions







Animal Bite Precautions

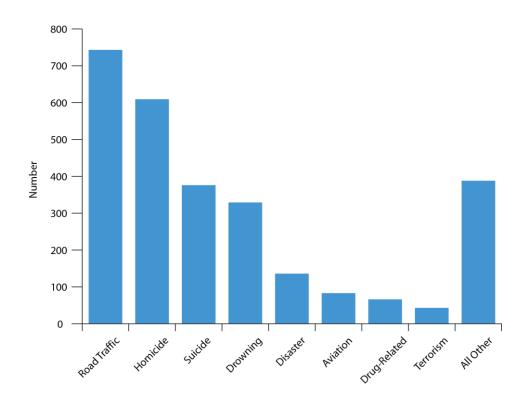
- Avoid animals!
 - Rabies can be highly prevalent in feral dogs and cats
 - Monkeys and bats (spelunking) also a source of exposure
 - Focus education/counseling on children
- If bitten by terrestrial mammal or bat:
 - Immediately wash wound with soap and water for several minutes
 - Seek medical attention as soon as possible
 - Rabies immune globulin plus vaccine needed if no preexposure vaccination given
 - Additional doses of vaccine required even if pre-travel vaccine was administered





Safety/Security

Leading Cause of Injury Death to US Citizens in Foreign Countries (2009-2011)





CDC Health Information for International Travel, 2014

Motor Vehicle Safety







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Travel Medicine Resources

- CDC Travel Health Site (The Yellow Book)
 - www.cdc.gov/travel
- Shoreland® Travax
 - https://mhs.health.mil/TRAVAX/travax.cshtml
- National Center for Medical Intelligence
 - www.intelink.gov/ncmi/index.php
- DHA Immunization Healthcare Branch (MILVAX)
 - www.vaccines.mil





Questions?



